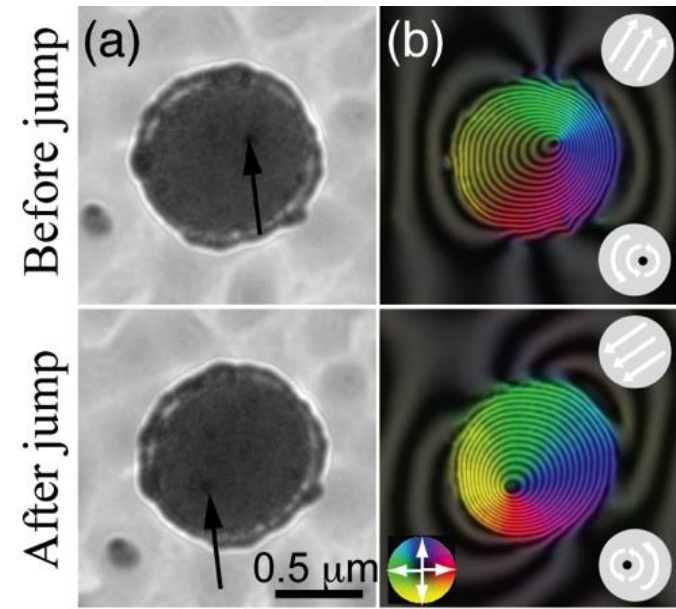


Anomalous Vortex Behavior in Coupled Permalloy Discs



Scientific Achievement

Visualization and control of magnetic spin configuration in patterned heterostructures

Significance and Impact

Fundamental understanding of competing energy terms that govern the spin texture and domain behavior in nanomagnetic systems

Research Details

–The nanoscale magnetization behavior in exchange coupled Permalloy discs with 20 nm thickness was analyzed using in-situ aberration-corrected Lorentz transmission electron microscopy

–In combination with modeling, we showed that the anomalous vortex behavior in the free layer is controlled by the demagnetizing energy of the pinned layer ($\approx 9.6 \times 10^{-2}$ erg/cm²), which dominates over the exchange coupling ($\approx 9.6 \times 10^{-3}$ erg/cm²) and shape anisotropy energy (≈ 0).

[1] S. Zhang, A. K. Petford-Long, O. Heinonen, and C. Phatak, Appl. Phys. Lett. 105, 212409 (2014).

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